

FEB 21 2007

Appl. No. 10/783,495
Amdt. dated 02/21/2007
Reply to Final Office Action of August 23, 2006

Attorney Docket No.: N1085-00251
[TSMC2003-0834]

AMENDMENTS TO THE CLAIMS

This listing and version of the claims replaces all prior listings and versions of the claims.

Listing of Claims:

1. (Original) A method for controlling exposure energy on a wafer substrate, comprising the steps of: controlling the exposure energy with a feedback process control signal of critical dimension, and further controlling the exposure energy with a feed forward process control signal of a compensation amount that compensates for wafer thickness variations.
2. (Original) The method of claim 1, further comprising the step of: combining the feed forward control signal with the feedback process control signal to control the exposure energy.
3. (Original) The method of claim 1, further comprising the step of: supplying the feed forward process control signal by a feed forward controller.
4. (Original) The method of claim 1, further comprising the step of: controlling the exposure energy by a feed forward control signal of an interlayer thickness measurement.
5. (Previously presented) The method of claim 1, further comprising the step of: controlling the exposure energy by a feed forward control signal of an interlayer thickness measurement remaining after chemical mechanical planarization thereof.
6. (Original) The method of claim 1, further comprising the step of: calculating the compensation amount according to a polynomial function with a coefficient of the function being based on a measurement of a remaining thickness of a planarized interlayer.

Appl. No. 10/783,495
Amdt. dated 02/21/2007
Reply to Final Office Action of August 23, 2006

Attorney Docket No.: N1085-00251
[TSMC2003-0834]

7. (Previously presented) The method of claim 1, further comprising the step of: calculating the feedback process control signal of critical dimension measurement of a top layer in a previous manufacturing lot.
8. (Previously presented) The method of claim 1, further comprising the steps of: calculating the compensation amount according to a polynomial function with a coefficient of the function being based on a measurement of a remaining thickness of a planarized interlayer; and calculating the feedback process control signal of critical dimension measurement of a top layer in a previous manufacturing lot.
9. (Original) The method of claim 1, further comprising the steps of: calculating the compensation amount according to a polynomial function with higher order coefficients set at zero.
10. (Original) The method of claim 1, further comprising the steps of: calculating the compensation amount according to a linear function.
11. (Original) The method of claim 1, further comprising the steps of: calculating the compensation amount according to a segmented linear function.
12. (Currently Amended) A system for controlling exposure energy on a wafer substrate, comprising:
 - a feed forward controller providing a feed forward control signal to an exposure apparatus based on a thickness measurement of an interlayer of the wafer substrate for controlling the exposure energy focused on a top layer of the wafer substrate, and
 - a feedback controller providing a feedback exposure energy control signal to the exposure apparatus based on criteria critical dimension measurement of a top layer of a wafer substrate of a previous manufacturing lot.

Appl. No. 10/783,495
Amdt. dated 02/21/2007
Reply to Final Office Action of August 23, 2006

Attorney Docket No.: N1085-00251
[TSMC2003-0834]

13. (Original) The system of claim 12, further comprising: a thickness measurement device providing thickness measurement data to the feed forward controller.
14. (Currently Amended) The system of claim 12, further comprising: a criteria dimension measurement device providing ~~criteria~~ critical dimension measurement data to the feedback controller.
15. (Currently Amended) The system of claim 12, further comprising:
a thickness measurement device providing thickness measurement data to the feed forward controller and
a ~~criteria~~ critical dimension measurement device providing ~~criteria~~ critical dimension measurement data to the feedback controller.
16. (Previously Presented) The system of claim 12, further comprising: a thickness measurement device providing thickness measurement data of a shallow trench isolation layer of the wafer substrate to the feed forward controller.
17. (Currently Amended) The system of claim 12, further comprising: a criteria dimension measurement device providing ~~criteria~~ critical dimension measurement data of a poly-gate of wafer substrates of a previous manufacturing lot.
18. (Currently Amended) The system of claim 12, further comprising:
a ~~[[A]]~~ thickness measurement device providing thickness measurement data of a shallow trench isolation layer of the wafer substrate to the feed forward controller, and
a ~~criteria~~ critical dimension measurement device providing ~~criteria~~ critical dimension measurement data of a poly-gate of a previous manufacturing lot.
19. (Original) The system of claim 12 wherein,
the feed forward controller is user configurable by having one or more polynomial coefficients set to zero in a polynomial function model.

Appl. No. 10/783,495
Amdt. dated 02/21/2007
Reply to Final Office Action of August 23, 2006

Attorney Docket No.: N1085-00251
[TSMC2003-0834]

20. (Original) The system of claim 12 wherein;
the feed forward controller is user configurable by having one or more polynomial coefficients set to zero in a polynomial function model.
21. (Previously presented) The system of claim 20, further comprising: a thickness measurement device providing thickness measurement data of a shallow trench isolation layer of the wafer substrate to the feed forward controller.
22. (Currently Amended) The system of claim 20, further comprising: a criteria dimension measurement device providing ~~criteria~~ critical dimension measurement data of a poly-gate of wafer substrates of a previous manufacturing lot.